

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (original): A control unit for controlling a motor for use in a printer comprising:

a position counter to count output pulses of an encoder that rotates to follow rotation of the motor, and thereby detect a position of a printing medium transferred by the motor;

a target control amount modifying and calculating part to calculate a modified target value of a feed-amount of the printing medium based on a target value of a feed-amount of the printing medium and a previous stop position of the printing medium detected by the position counter, and set a counted value of the position counter to the modified target value; and

a position control part to control the motor so that the counted value of the position counter falls into a predetermined range including zero.
2. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 1, wherein the printing medium is a paper and the motor is a paper-feed motor.
3. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 1, wherein the position control part performs PID control.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/651,096

4. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 1, wherein the position counter counts-up or counts-down the output pulses according a normal or reverse rotation of the motor.

5. (original): A control unit for controlling a motor for use in a printer comprising:

a position detecting part to detect a position of a printing medium transferred by the motor;

a target position modifying and calculating part to calculate a modified target position of the printing medium based on a target value of a feed-amount of the printing medium at the present motor start-up, another target value of a feed-amount of the printing medium at a previous motor start-up, and a position of the printing medium detected by the position detecting part just before the present motor start-up; and

a position control part to control the motor based on positional deviation of the position detected by the position detecting part from the modified target position.

6. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 5, wherein the target position modifying and calculating part includes:

an error calculating part to calculate an error of the feed-amount of the printing medium at the previous motor start-up based on a target value of a control amount at a previous motor start-up and the position detected by the position detecting part just before the present motor start-up; and

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/651,096

an adder to add the target value of a feed-amount of the printing medium at the present motor start-up and the error.

7. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 6, wherein the position detecting part is a position counter to count output pulses of an encoder that rotates to follow rotation of the motor, and the target position modifying and calculating part further includes a reset signal generating part to generate a reset signal for resetting a counted value of the position counter.

8. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 5, wherein the printing medium is a paper and the motor is a paper-feed motor.

9. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 5, wherein the position control part performs PID control.

10. (currently amended): A control method of controlling a motor for use in a printer comprising the steps of:

counting output pulses of an encoder that rotates to follow rotation of the motor and detecting a position of a printing medium transferred by the motor by a position counter;

~~calculating an modified~~ calculating a modified target value of a feed-amount of the printing medium based on a target value of a feed-amount of the printing medium and a previous

stop position of the printing medium detected by the position counter, and setting a counted value of the position counter to the modified target value; and

controlling the motor so that the counted value of the position counter falls into a predetermined range including zero.

11. (original): A control method of controlling a motor for use in a printer, as set forth in claim 10, wherein the printing medium is a paper and the motor is a paper-feed motor.

12. (original): A control method of controlling a motor for use in a printer, as set forth in claim 10, wherein the step of controlling performs PID control.

13. (original): A control method of controlling a motor for use in a printer, as set forth in claim 10, wherein the position counter counts-up or counts-down the output pulses according a normal or reverse rotation of the motor.

14. (original): A method of controlling a motor for use in a printer comprising the steps of:
detecting a position of a printing medium transferred by the motor;
calculating a modified target position value of the printing medium based on a target value of a feed-amount of the printing medium at the present motor start-up, another target value of a feed-amount of the printing medium at a previous motor start-up, and a position of the printing medium detected just before the present motor start-up; and

controlling the motor based on positional deviation of the position detected by the position detecting part from the modified target position.

15. (original): A control method of controlling a motor for use in a printer, as set forth in claim 14, wherein the step of calculating the modified target position includes the steps of:

calculating an error of the feed-amount of the printing medium at the previous motor start-up based on the target value of the a feed-amount of the printing medium at the previous motor start-up and the position detected by the position detecting part just before the present motor start-up; and

adding the target value of the feed-amount of the printing medium at the present motor start-up and the error.

16. (currently amended): A processor readable medium storing program code for causing a computer to control a motor for use in a printer comprising:

first program code means for, by a position counter, counting output pulses of an encoder that rotates to follow rotation of the motor to detect a position of a printing medium transferred by the motor;

second program code means for modifying and calculating part to ~~calculate an~~ modified calculate a modified target value of a feed-amount of the printing medium based on a target value of a feed-amount of the printing medium and a previous stop position of the printing medium detected by the position counter, and setting a counted value of the position counter to the modified target value; and

third program code means for controlling the motor so that the counted value of the position counter falls into a predetermined range including zero.

17. (original): A processor readable medium storing program code for causing a computer to control a motor for use in a printer comprising:

first program code means for detecting a position of a printing medium transferred by the motor;

second program code means for calculating a modified target position of the printing medium based on a target value of a feed-amount of the printing medium at the present motor start-up, another target value of a feed-amount of the printing medium at a previous motor start-up, and a position of the printing medium detected just before the present motor start-up; and

third program code means for controlling the motor based on positional deviation of the detected position of the printing medium from the modified target position.

18. (currently amended): A control unit for controlling a motor for use in a printer comprising:

a position counter to detect a position of a sheet of paper transferred by a paper-feed motor based on output pulses of an encoder that rotates to follow rotation of the paper-feed motor;

a driving part to apply a current value to the paper-feed motor based on a target value of a feed-amount of the sheet of paper and an output of the position counter, to drive the paper-feed motor;

a current value signal generating part to determine whether the absolute value of deviation of the output of the position counter from the target value of the feed-amount of the sheet of paper falls in the range of a first predetermined value to a second predetermined value smaller than the first predetermined value during stoppage of the paper-feed motor, to generate a current value signal, when the absolute value of deviation falls in the range, so that the deviation becomes zero,

wherein the driving part ~~drives~~starts the paper-feed motor based on the current value signal when the paper-feed motor is stopped.

19. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 18 further comprising a paper delivery part for performing a paper delivery operation, wherein the current value signal generating part feeds a paper delivery command to the paper delivery part when the absolute value of deviation is larger than the first predetermined value, thus the paper delivery part performs the paper delivery operation.

20. (original): A control unit for controlling a motor for use in a printer, as set forth in claim 18, wherein the driving part includes a PID control part.

21. (original): A control method of controlling a motor for use in a printer comprising the steps of:

obtaining deviation, while a paper-feed motor is stopping, of an actual feed-amount of a sheet of paper calculated based on output pulses of an encoder that rotates to follow rotation of a paper-feed motor from a target feed-amount of the sheet of paper at a previous motor start-up;

determining whether the absolute value of the deviation falls in the range of a first predetermined value and a second predetermined value smaller than the first predetermined value;

generating a current value signal so that the deviation becomes zero when the absolute value falls in the range; and

controlling the paper-feed motor based on the current value signal.

22. (original): A control method of controlling a motor for use in a printer, as set forth in claim 20 further comprising the step of performing a paper delivery operation when the absolute value of the deviation is larger than the first predetermined value.

23. (original): A processor readable medium storing program code for causing a computer to control a motor for use in a printer comprising the steps of:

first program code means for obtaining deviation, while a paper-feed motor is stopping, of an actual feed-amount of a sheet of paper calculated based on output pulses of an encoder that rotates to follow rotation of a paper-feed motor from a target feed-amount of the sheet of paper at a previous motor startup;

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/651,096

second program code means for determining whether the absolute value of the deviation falls in the range of a first predetermined value and a second predetermined value smaller than the first predetermined value;

third program code means for generating a current value signal so that the deviation becomes zero when the absolute value falls into the range ; and

fourth program code means for controlling the paper-feed motor based on the current value signal.